

USDA  
NATURAL RESOURCES  
CONSERVATION SERVICE  
  
DELAWARE CONSERVATION  
PRACTICE STANDARD  
  
**WATER AND SEDIMENT  
CONTROL BASIN**

CODE 638  
(Reported by No.)

**DEFINITION**

An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.

**PURPOSES**

A water and sediment control basin may be established to:

- Improve farmability of sloping land.
- Reduce watercourse and gully erosion.
- Trap sediment.
- Reduce and manage onsite and downstream runoff.
- Improve downstream water quality.

**CONDITIONS WHERE PRACTICE  
APPLIES**

This practice applies to sites where:

- The topography is generally irregular.

- Watercourse or gully erosion is a problem.
- Sheet and rill erosion is controlled by other conservation practices.
- Runoff and sediment damage land and improvements.
- Soil and site conditions are suitable.
- Adequate outlets can be provided.

Water and sediment control basins shall not be used in place of terraces. Where a ridge and/or channel extend beyond the detention basin or level embankment, standards for Terrace (600) or Diversion (362) must be applied as appropriate.

**CONSIDERATIONS**

Water and sediment control basins should be part of a resource management plan including such practices as terraces, grassed waterways, contouring, a conservation cropping system, conservation tillage, and crop residue management.

Where possible, the basin should be configured to enhance sediment deposition. This can be accomplished by using flow deflectors, inlet and outlet selection, and by adjusting the length to width ratio.

For cropped fields, embankment orientation and crop row direction should be approximately perpendicular to the land slope to support contour farming. The design should support farmability by limiting short point rows or sharp curves. Field boundaries and row lengths should also be considered in planning basin location and row direction.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

This practice can be used to develop/enhance seasonally ponded areas for migratory waterfowl.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Where possible, the design should enhance habitat for native and endangered species.

Effects on downstream water quality and temperature may be critical for some species.

This practice has the potential to affect National Register listed cultural resources or eligible (significant) cultural resources. These may include archeological, historic, or traditional cultural properties. Care should be taken to avoid adverse impacts to these resources. Follow NRCS state policy for considering cultural resources during planning.

Operation safety of vehicle and farming equipment should be considered when selecting cut and fill slopes, especially where cropping or haying is planned.

### **CRITERIA**

#### **Criteria Applicable to All Purposes**

The resource management system must reduce soil loss in the interval above and below the basin to prevent excessive maintenance and operation problems.

Where land ownership or physical conditions preclude treatment of the upper portion of a slope, a water and sediment control basin may be used to separate this area from, and permit treatment of the lower slope.

The design must limit inundation, infiltration, and seepage to prevent crop damage and/or other problems.

This practice must conform to all federal, state, and local laws and regulations. Laws and regulations of particular concern include those involving water rights, dam construction, land use, pollution control, property easements, and wetlands, including DNREC, Delaware Sediment and Stormwater Regulations.

**Spacing.** Water and sediment control basins must generally be spaced at terrace intervals (see standard for Terrace (600)). Adjust spacing or include other measures needed to prevent erosion in the watercourse between basins.

The system of basins and row arrangements must be parallel and spaced to accommodate

farm machinery where needed to fit row crop spacing.

Spacing design must consider embankment slope lengths, top width, and outlet location.

**Cross Section.** For portions of the basin controlling only flowing water 3 feet or less deep, embankment slopes must be two horizontal to one vertical, or flatter. For all other portions of the basin, the sum of the upstream and downstream slopes must be 5:1 or flatter with a maximum 2:1 in either slope. Slopes may be vegetated or flattened to permit cropping.

**Earth Embankment.** Minimum effective top widths are given in Table 1. Constructed embankment height must be at least 5% greater than design height to allow for settlement. The maximum settled height of the embankment must be 15 feet or less measured from natural ground at centerline of the embankment.

**Table 1**

**Minimum Top Width of Embankments**

Fill Height (Feet)	Effective Top Width (Feet)
0-5	3
5-10	6
10-15	8

**Foundation Cutoff and Seepage Control.** Portions of basin ridges designed to impound more than a 3-foot depth of water must include foundation cutoff and seepage control as required by the standard for Pond (378).

**Capacity.** Basins must have capacity to prevent overtopping by runoff from a 10-year frequency, 24-hour duration storm. Larger design storms may be used where needed for flood control or other purposes.

In addition to the above storage, basins must have capacity to store at least the anticipated 10-year sediment accumulation, or periodic sediment removal must be provided to maintain the required capacity.

Basin ends must be closed to an elevation that will contain design capacity. Freeboard may be added to design height to provide for safe operation of auxiliary spillways. Auxiliary spillways must not contribute runoff to a lower basin (or pond) except where the lower basin (or pond) is designed to control the flow.

**Outlets.** Water and sediment control basins must have spillways, underground outlets or soil infiltration outlets that conform to standards for Pond (378), Grassed Waterway (412), Diversion (362) or Underground Outlet (620) as appropriate.

**Topsoil.** Where necessary to restore or maintain productivity, topsoil must be stockpiled and spread over disturbed areas.

**Vegetation.** Disturbed areas that are not cropped must be established to appropriate vegetation or otherwise protected from erosion using organic or gravel mulch or other measures.

Selection of vegetation species must consider environmental quantity and quality, endangered species needs, and wildlife food and habitat needs. Seedbed preparation, fertilizing, seeding, and mulching must be in accordance with standards for Critical Area Planting (342) and Mulching (484).

### **PLANS AND SPECIFICATIONS**

Plans and specifications for establishment of this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail to ensure success of the practice. Documentation shall be in accordance with the section "Supporting Data and Documentation" in this standard.

### **OPERATION AND MAINTENANCE**

A site specific Operation and Maintenance (O&M) plan shall be prepared for and reviewed with the landowner or operator. The plan shall contain guidance to maintain the embankment, design capacity, vegetative cover and outlet.

All plans shall include a provision that after each large storm, basins must be inspected and needed maintenance performed. When sediment storage is full, accumulated sediment must be removed or

the basin must be redesigned and modified to restore capacity.

Where designs include underground outlets, O&M plans should include checking for clogging and/or pipe damage.

### **SUPPORTING DATA FOR DOCUMENTATION**

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Extent of planting in acres, field number where the practice located, and the location of the practice marked on the conservation plan map.
2. Assistance notes.

### **Field Data and Survey Notes**

The following is a list of the minimum data needed:

1. Plan view sketch.
2. Establish and describe a temporary benchmark.
3. Topographic survey of the area of the proposed water and sediment control basin.
4. Location and description of trees and other obstacles that may need to be removed.
5. Location and elevation of soil borings.
6. Cross sections and profile of the proposed outlet for the proposed water and sediment control basin.

### **Design Data**

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook - Part 650. The following is a list of the minimum required design data:

1. Locate the practice on the farm plan map in the case file.
2. Determine soil type and any special restrictions.

3. Design the water and sediment control basin to meet the criteria of this practice standard.
4. Determine peak runoff from the contributing drainage area for the required design storm in accordance with Chapter 2 of the Engineering Field Handbook - Part 650, or by other approved method.
5. Size the principal spillway in accordance with Chapter 3 of the Engineering Field Handbook - Part 650, or other source.
6. Size the emergency spillway in accordance with Chapter 11 of the Engineering Field Handbook - Part 650, or other source.
7. Provide for the safe outlet of discharge from the water and sediment control basin.
8. Provide for the control of erosion during and following construction.
9. Show the engineering job class on the plans.
10. Estimated quantities.
11. Planting plan. This must meet the criteria, specifications, and documentation requirements of the conservation practice standard. Show on the plans.
12. Written Operation and Maintenance Plan.
4. Profile notes along centerline of earth spillway.
5. Cross section notes of emergency spillways as needed to determine whether planned grade and dimensions have been met.
6. Location, size, type, grade, and/or pertinent elevations of the principal spillway.
7. Statement as to the condition or adequacy of vegetation on the embankment, spillway, and other disturbed areas.
8. Type and location of fencing and safety features where appropriate.
9. Final quantities and documentation for quantity changes. Material certifications as appropriate.
10. Signature and date on the check-notes and plans of someone with appropriate engineering job approval authority. Include a written statement that the constructed practice meets or exceeds the construction plans and NRCS practice standards.

#### **Construction Check Data/As-Built Plans**

Record on survey notepaper, NRCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted in red on the as-built plans. The following is a list of minimum data needed for as-built documentation:

1. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed and decisions made and by whom.
2. Profile notes along centerline of top of completed embankment.
3. Cross section notes at one or more locations on the completed embankment.